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Lynette P. Padmore &amp; Edna L. Cofield

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The acronym BIONR uniquely identifies the major participants in a program designed to increase the number of students opting for graduate and professional/graduate careers in the biological sciences - the Biology Department at Florida A&M University (BIO) and the Office of Naval Research (ONR) - thus BIONR. The program is specifically designed for biology majors who plan on pursuing the Ph.D. or the M.D./Ph.D. degree. Even though the program focuses on embellishing the biology major, other science students/majors receive secondary benefits since they have the opportunity to participate in most elements of the program.

The recruitment component is broad-based and solicits input from high school teachers and counselors, parents and other interested individuals. The pre-college component focuses on high ability students in the eleventh and twelfth grades and on those high school graduates who have expressed an interest in the biological sciences and have been admitted to Florida A&M University. During the summer, these students are exposed to five weeks of intense course related activities.

The BIONR program received initial funding in 1989. Participants at both the high school and undergraduate levels have experienced a high level of success owing to the 'holistic' approach.

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## FAMU/BIONR CENTER FOR ADVANCING STUDENTS' PARTICIPATION IN BIOLOGY AND CHEMISTRY

### Overview:

The acronym BIONR uniquely identifies the major participants in a program designed to increase the number of students opting for graduate and professional/graduate careers in the biological and related sciences - the Biology Department at Florida A & M University (BIO) and the Office of Naval Research (ONR) - thus BIONR. The program has been expanded to include chemistry as well as biology majors who plan to pursue the Ph.D. or Ph. D./M.D. degree. In the past, the program focused on enhancing the academic preparation of biology majors. Chemistry majors have recently been included and will have the opportunity to participate in most elements of the program.

The recruitment component is broad-based and solicits input from high school teachers and counselor, parents and other interested individuals. The pre-college component focuses on high ability students in the eleventh and twelfth grades and on those high school graduates who have expressed an interest in biology or chemistry and have been admitted to Florida A & M University. During the summer, these students are exposed to five weeks of intense course related activities. Participants reside on campus and follow a specific schedule. Undergraduates admitted into the program and identified as BIONR Scholars and follow a prescribed curriculum which requires that they have at least one, preferably two, extramural research assignments during their undergraduate experience. In addition, scholars are involved in various activities designed to nurture their leadership abilities. These activities may involve tutoring high school science fairs or opting for a community-based project which will impact the learning of middle school or high school students.

The BIONR program received initial funding in 1989. Participants at both the high school and undergraduate levels have experienced a high level of success owing to the holistic approach. The BIONR concept embraces recruitment, advisement, counseling, curriculum enhancement and peer mentoring. All of these elements combine to yield a product which will positively impact on graduate education in the biological and physical sciences.

The credo adopted by the BIONR group continues to be the beacon of our efforts:

*"Whatever one touches, his aim should always be to  
leave that which he touches better than he found it"*  
Benjamin Mays

## **BIONR Program Goals**

- *To increase significantly the recruitment, enrollment, retention and graduation rates of students attracted to and enrolled in biology and related areas.*
- *To increase the number of FAMU graduates applying to graduate programs in the biological sciences*

The **BIONR Schematic Flowchart** captures the essence of the program focus and serves as a key advisement and mentoring tool. Early and sustained exposure to study skills strategies, group dynamics and content overview has positively influenced student retention and progression in the undergraduate years. We have found that the prefreshman bridge element has impacted on participants' timely progression in their majors. In general, students who complete the freshman year in good standing tend to continue with the same impetus and complete the undergraduate degree in eight or, in a few instances, nine/ten semesters. These figures are significantly higher than comparable percentages for the general biology population.

### **1990 Admittees**

- 6 of 8 (75%) graduated 8-9 semesters
- All but one of these students were honor graduates
- Two students continue on a decelerated basis as program associates in science education and biology.

### **1991 Admittees**

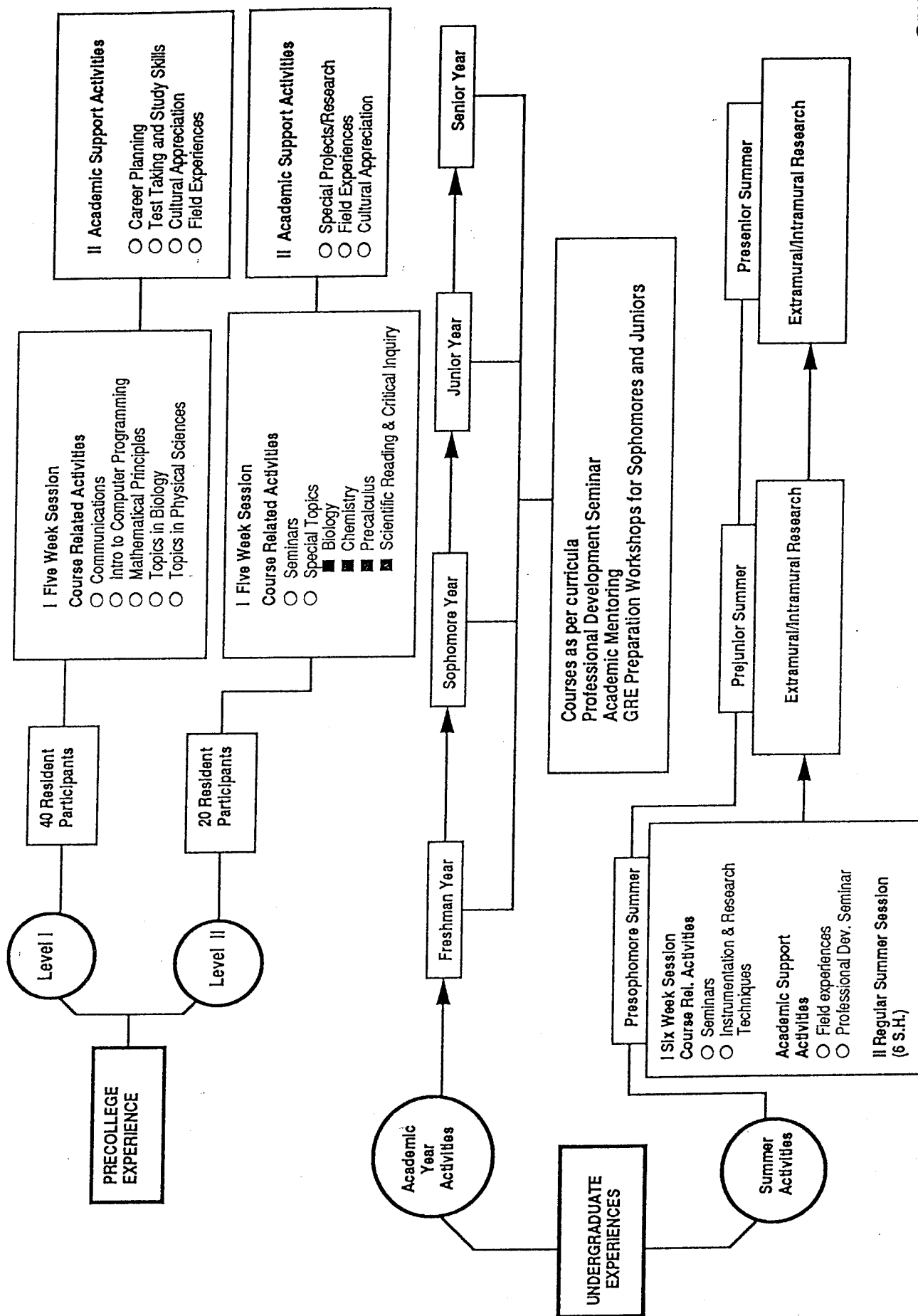
- 7 of 9 (78%) graduated in 8-9 semesters
- All of these students were honor graduates
- Two students are continuing in the major at a decelerated pace

### **1992 Admittees**

- All four (4) of the 1992 admittees are expected to graduate in 8 semesters with honors.

The prejunior and presenior summer exposures have broadened the students' perspective of science applications. The BIONR scholars are enrolled for an average of sixteen (16) hours per semester. Some are enrolled for as many as eighteen (18) hours. This type of schedule does not permit for indepth research exposure which is expected to ultimately influence their career decisions. The collaboration we have formed with laboratories and graduate programs has provided both needed research experience and summer support. These associations have provided the BIONR program with significant exposure around the country. (see BIONR Scholars Summer Internships table)

# FAMU/BIONR SCHEMATIC FLOWCHART



**BIONR SCHOLARS**  
**Summer Internships**  
**(1990-1994)**

Name	Internship Year(s)	Preceptor(s)	Location	Project Title
Brooks, Alexis	1990	Dr. Timothy Limkins	Baylor College of Medicine	Cellular Aging: Isolating the SUSM-1 Derived Protein Inhibitor
	1991	Dr. Phillip Rosenthal	University of California San Francisco, CA	A Comparison of the Malarial Trophozoite Cysteine Proteinase of Six Strains of <i>Plasmodium falciparum</i> .
Chandler, Isaac	1991		Environmental Protection Agency	Ecotoxicology: Determining Cytotoxicity Using New Culturing Techniques with <i>Cyprinodon variegatus</i>
	1992	Mr. G. Seamon	The Nature Conservancy	Element Stewardship Abstracts of Cogonard and Climbing Fern.
Mickens, Sonya	1991		University of Virginia Charlottesville, VA	A Novel Coupled Assay for Linamarase Using NADP <sup>+</sup> /NAD <sup>++</sup> Dependent Auxillary Enzyme Systems Enhancement Coursework
	1992	Dr. Latinwo	Florida A&M University	
Power, Mentoria	1991	Dr. Clinton Webb	Emory University	Enhancement Coursework
	1992	Dr. Richard Miller	University of Miami Medical School	Enhancement Coursework
	1993	Dr. Nancy Kanagy	University of Michigan	The Effect of Nitric Oxide on Vascular Smooth Muscle Enhancement Coursework
Reed, Yolanda	1991	Dr. G. Brown	University of Virginia Charlottesville, VA	Molecular Analysis of Genes Coding for a Bacteria Polysaccharide
	1992	Dr. S. Hill	Baylor University Graduate School	

Bryant, Acquinonette	1993 & 1994	Dr. H. Tak Cheung	University of Illinois	Development and the Understanding of a Technique for determining the Effects of Matrigel on Antibodies Production
Croskey, Djenabra	1993 & 1994	Dr. H. Tak Cheung	University of Illinois	Thymocyte Adhesion to Basement Membrane Protein
Dowe, Darryl	1993	Ms. Claudette Buckingham	Michigan State University	Vetward Bound Enrichment Summer Program
	1994	Dr. T. Campbell	Animal General Hospital	Animal Health Technology
Hamilton, Nikki	1993	Dr. Louis Archibold	University of Florida	College of Veterinary Medicine Intern
	1994	Dr. Jayaswal	Lysins in <i>Staphylococcus aureus</i> phages	University of Illinois
Miller, Alfreda	1993	Dr. Richard M. Weenshelboun	Mayo Graduate School	Human Liver Estrogen Sulfotransferase: Sequencing and Expression of cDNA
	1994	Dr. Juanita Reid	Pfizer Laboratory	Fluorescence In Situ Hybridization
Singleton, Andrea	1993	Ms. Gail Williams	Eastern Virginia Medical School	Summer Science Research Enrichment Study
Walker, Valencia	1993 & 1994	Dr. Asaf Keller	Uniformed Services University of the Health Services	Development of Motor Cortex in Rats
White, LaTania	1993	Dr. Don Cameron	University of South Florida	Regulation and Mechanism of Spermatic Binding
	1994	Dr. Carlton Baker		Plant Binding Proteins
Hill, Glenwood	1993, 1994 & 1995	Dr. Sharon Juiliano	Uniformed Services of the Health Services	Composition and Neuronal Connections of the Rat Somatosensory Cortex and Rat Embryonic Somatosensory Cortex Transplants.
Parker, Jefferson	1994 & 1995	Dr. Jeffery Hanke	Pfizer Laboratory	Expression of a Transgene when Injected
Polk, Artisha	1994	Dr. Timothy Kurtii	University of Minnesota	Characterization of <i>Borrelia burgdorferi</i> in Immunized Tick Cells
Rogers, Rashelle	1994	Dr. Eleanor G. Rogan	University of Nebraska	Binding of PAH to Rat and Mouse Mammary Glands

Ward, Jackqueline	1991	Dr. Lucher	U.S. Army Reserves	U. S Army Reserves
	1992		Illinois State University	Effects of Increasing AD12 E1A Protein Concentrations in Abortive Infections. A Direct Approach.
Brown, Joedrecka	1992	Dr. D. Jelinek	Mayo Graduate School	Phenotypic Analysis of B-Chronic Lymphocytic Leukemia Cell
	1993	Dr. Ann Cunningham	Pfizer Laboratory	The Parallel Expression of IL-Z receptor with adhesion molecules N and allergenic response culture
Brown, Kenya	1992	Dr. F. Jackson	University of Maryland	The Effects of Nitrogenous Compounds on the Height, Morphological Development, and Harvest Yields of <i>Sorghum bicolor</i> .
	1993	Dr. P Pluman	Pfizer Laboratory	High Through Put Sequence Analysis of Mouse Adiposity cDNA Library.
Farmer, Shurron	1992	Dr. S. Honda	Baylor University Graduate School	Summer Mathematic Institute
	1993	Dr. Uri Treisman	University of California @ Berkeley	Intergrating Science and Math Summer Institute
Patterson, Irette	1992	Dr. T. Landefeld	University of Michigan	Differences Between Prolactin mRNA and Serum Amounts
	1993	Dr. Nita Maihle	Mayo Graduate School	The Amount of p53 in the serum of women who have ovarian cancer.
Williams, Thomas C.	1992	Dr. M. Sadowsky	University of Minnesota	Isolating IGG and IGE Antibacteria form Rat Serum Using Infinite Chromatography
	1993	Dr. Matthew Gilmore	Environmental Protection Agency	Effect of Calcium on the Osmotic Fragility of Erythrocytes
Wilson, Kennessa	1992	Dr. N. Swisloki	Graduate School of Biomedical Sciences; University of Medicine and Dentistry of New Jersey	
	1993	Dr. N. Hernday	Environmental Protection Agency	Induction of Peroxisome Proliferation in the B6C3F1

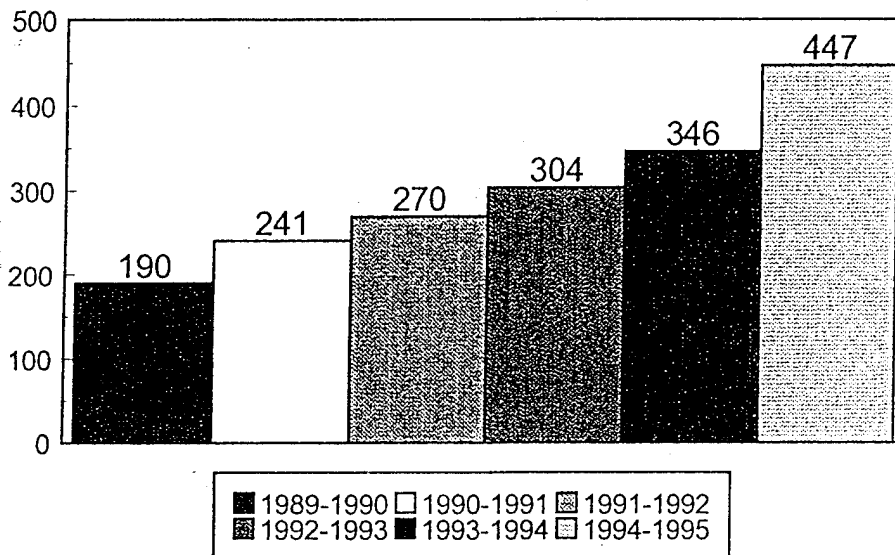


## BIONR Impact

The following charts/graphs illustrate the impact which the BIONR Program has had on the biology department at Florida A & M University.

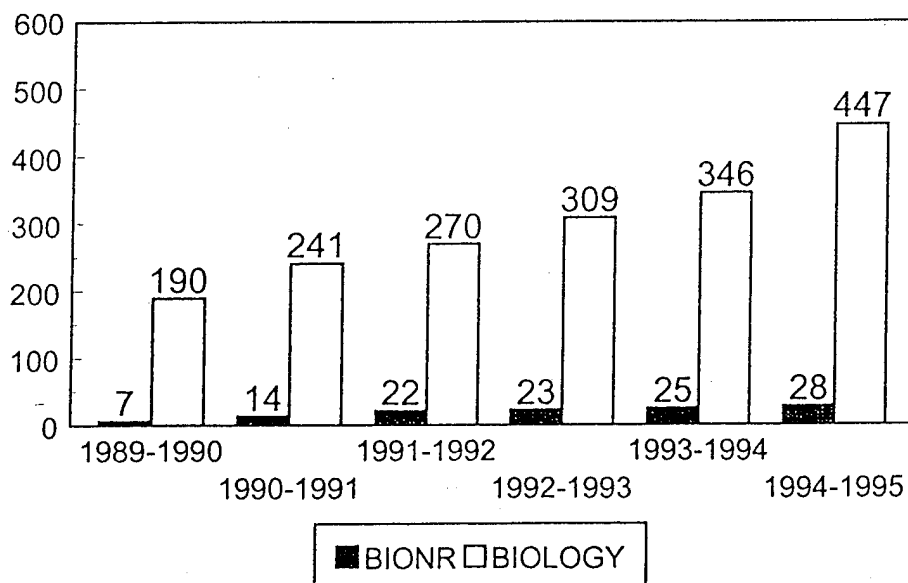
### Departmental Enrollment:

Enrollment in the department has steadily increased since 1989.



### Departmental Enrollment/BIONR Participation

The retention figures for participants in the BIONR program ranged from 80% to 85% over the period 1990 to 1995. When BIONR participation is compared to departmental enrollment, progression is clearly demonstrated.



## ENROLLMENT STATISTICS

### BIONR PARTICIPANTS BY YEAR

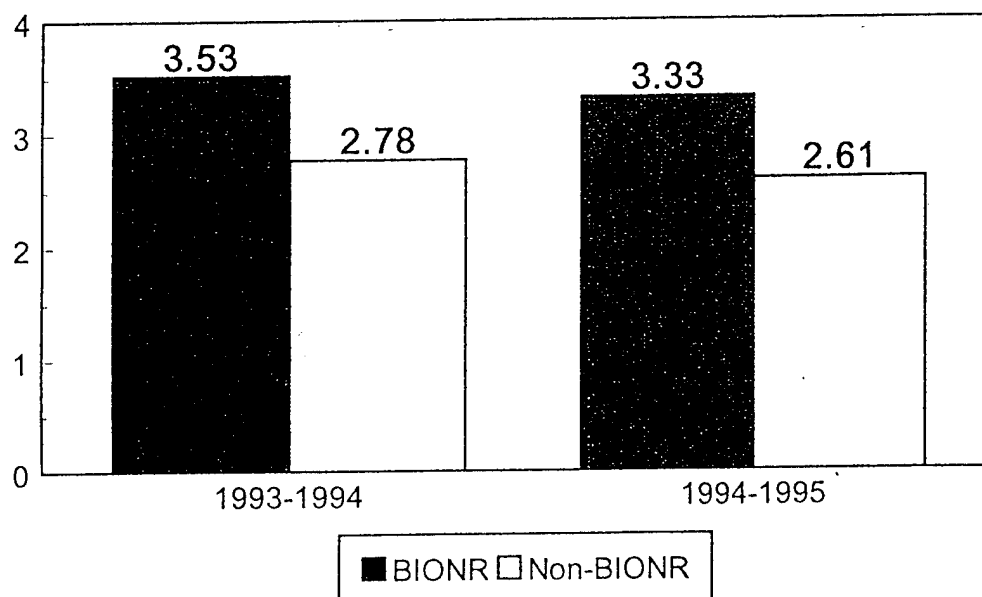
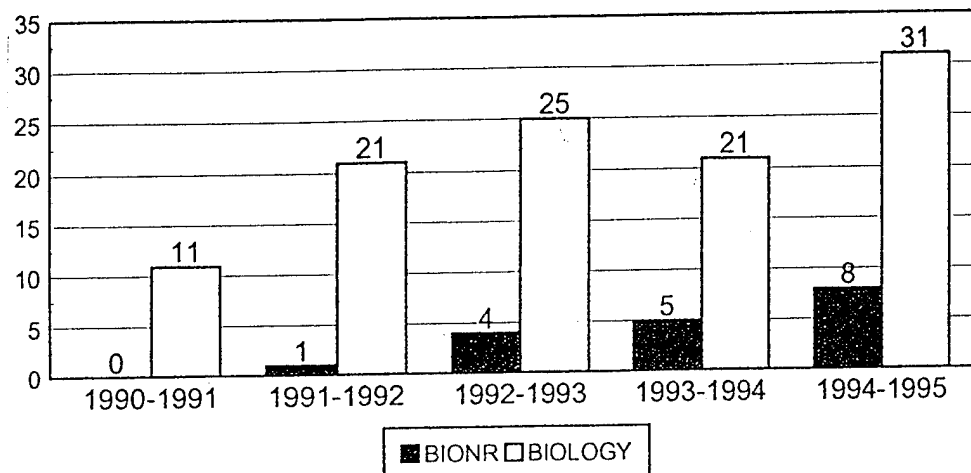
YEARS	NUMBER OF PARTICIPANTS
1989 - 1990	7
1990 - 1991	14
1991 - 1992	22
1992 - 1993	23
1993 - 1994	25
1994 - 1995	38

### BIONR ASSOCIATES ( Staff Mentoring: No Financial Support )

YEAR	NUMBER OF PARTICIPANTS
1989 - 1990	1 (decelerated)
1990 - 1991	2 (decelerated)
1991 - 1992	2 (1 decelerated) (1 transfered)
1992 - 1993	0
1993 - 1994	3 (2 changed major) (1 decelerated)
1994 - 1995	6 (3 changed institutions) (3 changed majors)
TOTAL	15

### Departmental Graduation Rate

This illustrates the relationship of BIONR graduates to that of the departmental population. For those students receiving the full BIONR treatment as illustrated in the schematic flowchart, the BIONR graduation rate is approximately 25% of the departmental graduation rate even though the group comprised only 3% of the 1990 and 1991 entering class.



**Mean SAT Scores of BIONR vs Non-BIONR Freshman**

The following table illustrates a year by year comparison of SAT (or ACT to SAT converted) scores of entering freshman and BIONR freshman. In general the BIONR freshman student scores ranged from 850 to 1140. Two students were beyond this range with scores of 1290 and 1300.

	Fall '90	Fall '91	Fall '92	Fall '93	Fall '94
BIONR SAT	1080.00	1015.00	1112.00	1072.00	1090.00
All Freshman SAT	879.00	911.00	934.00	953.00	9.35.46

**Mean BIONR GPA**

The following table illustrates a year by year tabulation of the average GPAs of entering BIONR freshman.

Years (Entrance Fall Semester)	Mean GPA
1989	3.44
1990	3.50
1991	3.48
1992	3.62
1993	3.50
1994	3.43

**Additional Funding Sources:**

University of Florida School of Pre-veterinary Medicine  
Environmental Protection Agency  
Florida State Environmental Protection Program  
TRW Foundation Minority Scholarship  
Leander Boykin Achievement Award (FAMU)  
Distinguish Scholar Award (FAMU)  
Presidential Scholar Program (FAMU)  
Outstanding Biology Student Award (FAMU)

**FAMU /BIONR Center for Advancing Students' Participation in  
Biology and Chemistry**

**BIONR  
STUDENTS' PROGRESSION  
1989-1994**

STUDENT	ENTRANCE YEAR	ENTRY STATUS	CURRENT STATUS
Brooks, Alexis	1989	Sophomore	Graduated: <u>Spr. 1992</u> Graduate School: <u>Univ. of Alabama at Birmingham-Microbiology Program</u> Preceptor: <u>Dr. David Briles, Microbiology Department</u>
Chandler, Isaac	1989	Sophomore	Graduated: <u>Spr. 1993</u> , Grad. School: <u>Univ. of Florida, Zoology Program</u> Preceptor: <u>Dr. Wiley Kitchens, Wildlife Division</u>
Mickens, Sonya	1989	Freshman	Graduated: <u>Spr. 1993</u> Medical School: <u>University of Florida</u>
Power, Mentoria	1989	Freshman	Graduated: <u>Spr. 1994</u> Post-baccalaureate Program: <u>Georgia Tech</u>
Reed, Yolanda	1989	Freshman	Graduated: <u>Spr. 1993</u> Medical School: <u>Howard University</u>
*Avalos-Taylor, Marie	1989	Freshman	Junior: Part-time
Ward, Jackqueline	1989	Sophomore	Graduated: <u>Spr. 1993</u> Medical School: <u>University of Chicago</u>
Brown, Joedrecka	1990	Freshman	Graduated <u>Spr. 1994</u> Ph.D. / M.D. Program <u>Emory University</u>
Brown, Kenya	1990	Freshman	Senior Graduation date: <u>Fall 94</u>
Farmer, Shurron	1990	Freshman	Graduated ; <u>Spr. 1994</u> , Grad. School: <u>Howard University, Math. Program</u> Pre: <u>Dr. Duraiswamy Sundararaman</u>
*Jean, Attania	1990	Freshman	Senior Graduation date: <u>Spr. 94</u>
Patterson, Irette	1990	Freshman	Graduated: <u>Spr. 1994</u> , Grad. School: <u>Mayo Grad. School Immunology Prog.</u> Preceptor: <u>Dr. Nita Maihle, Dept. of Biochemistry/Molecular Biology</u>

STUDENT	ENTRANCE YEAR	ENTRY STATUS	CURRENT STATUS
Regular, Myrtis	1990	Freshman	Transferred: <u>Georgia Tech. 1992</u>
Williams, Carlton	1990	Freshman	Graduated: Fall 1994
Wilson, Kennessa	1990	Freshman	Graduated: <u>Spr. 1994</u> Ph.D. / M.D. Program: <u>University of Miami</u>
Bryant, Acquinonette	1991	Freshman	Graduated: Spr. 1995
Croskey, Djenabra	1991	Freshman	Graduated: Spr. 1995
Dowe, Darryl	1991	Freshman	Senior Graduation date: Fall 1995
Hamilton, Nikki	1991	Freshman	Graduated: Spr. 1995
*Henderson, Katina	1991	Freshman	Senior Graduation date: Summer 1995
*Love, Carlos	1991	Freshman	Transferred: <u>Univ. of North Florida</u>
Singleton, Andrea	1991	Freshman	Senior Graduation date: Summer 1995
Walker, Valencia	1991	Freshman	Graduated: Spr. 1995 Accepted to Emory University
White, LaTamia	1991	Freshman	Graduated: Spr. 1995 Accepted to University of So. Florida
Hill, Glenwood	1992	Freshman	Senior
*James, Cean	1994	Junior	Senior
*James, Cynthia	1994	Junior	Senior
Parker, Jefferson	1992	Freshman	Senior
Polk, Artisha	1992	Freshman	Senior
Rogers, Rashelle	1992	Freshman	Senior
*Brown, Joel	1993	Freshman	Junior: Mathematics major
Campbell, Marceline	1993	Freshman	Junior:
Forrest, Natasha	1993	Freshman	Junior:
*Harmon, Tracy	1993	Freshman	Junior: Chemical Engineering
Johnson, Courtney	1993	Freshman	Junior:
*Leonard, LeVin	1993	Freshman	Sophomore
*Morgan, Shamita	1993	Freshman	Junior:
Scott, Cherise	1993	Freshman	Junior:
*Allen, Hosea	1994	Freshman	Sophomore Transferred: University of Alabama
*Britto, Veronica	1994	Freshman	Sophomore Changed Major: Psychology
*Boykin, Fekeshia	1994	Freshman	Sophomore Transferred: University of Alabama
Brown, Jarryd	1994	Freshman	Sophomore
Canty, Natosha	1994	Freshman	Sophomore
Chase, Tarik	1994	Freshman	Sophomore
Clayton, LaNetra	1994	Freshman	Sophomore
Cooper, Kimberly	1994	Freshman	Sophomore

*Diggs, Diallyo	1994	Freshman	Sophomore Changed Major: Psychology
*Griffin, Tanesha	1994	Freshman	Sophomore Changed Major: Chemical Engineering
Hardie, Gary	1994	Freshman	Sophomore
*Jones, Dorothy	1994	Freshman	Sophomore Changed Major: Nursing
*Robinson, Jeanene	1994	Freshman	Sophomore Changed Major: Psychology
Smith, Amelia	1994	Freshman	Sophomore
*Smith, Jimmie	1994	Freshman	Sophomore Transferred: University of Alabama
Williams, Latrina	1994	Freshman	Sophomore

\* BIONR Associates

**BIONR Graduate Placement:**

This table illustrates a portion BIONR Scholars that have entered graduate/professional school.

Student	Graduate/Professional School
Brooks, Alexis	<b>Graduated:</b> Spr. 1992 3rd Year Graduate Student; University of Alabama at Birmingham-Microbiology Department <b>Preceptor:</b> Dr. David Briles
Chandler, Isaac	<b>Graduated:</b> Spr. 1993 2nd Year Graduate Student; University of Florida-Zoology Department-Wildlife Division <b>Preceptor:</b> Dr. Wiley Kitchens
Mickens, Sonya	<b>Graduated:</b> Spr 1993 1st Year Medical Student; University of Florida Medical School
Reed, Yolanda	<b>Graduated:</b> Spr. 1993 2nd Year Medical Student; Howard University Medical School
Ward, Jackqueline	<b>Graduated:</b> Spr. 1993 2nd Year Medical Student; University of Chicago Medical School
Brown, Joedrecka	<b>Graduated:</b> Spr. 1994 Emory University Ph.D./M.D. Program
Farmer, Shurron	<b>Graduated:</b> Spr. 1994 2nd Year Graduate Student; Howard University-Mathematics Prog <b>Preceptor:</b> Dr. Duraiswamy Sundararaman
Williams, Carlton	<b>Graduated:</b> Fall 1994 Florida A&M University-Master Program(Secondary Science Ed.) <b>Preceptor:</b> Dr. William Castine
Wilson, Kennessa	<b>Graduated:</b> Spr. 1994 University of Miami-Ph.D./M.D. Program - Immunology
Hamilton, Nikki	<b>Graduated:</b> Spr. 1995 University of Florida-School of Veterinary Medicine <b>Preceptor:</b> Dr. Archibold
Miller, Alfreda	<b>Graduated:</b> Spr. 1995 Ph.D./M.D. Program-Southern University
Walker, Valencia	<b>Graduated:</b> Spr. 1995 Ph.D./M.D. Program-Emory University
White, LaTamia	<b>Graduated:</b> Spr. 1995 University of South Florida Medical School